From:	David Good
To:	Linc Wehrly
Cc:	Chris Nevers; Stephen Healy; Jim Snyder; Joel Ball
Subject:	Fw: Gasoline PM testing history, etc
Date:	11/30/2010 05:51 PM
Attachments:	EPA gasoline PM testing-7-23-08 short version.xls gasoline PM one pager.107.wpd KC-CRC-and-LADCO-presentation03-21-07.ppt Verify PM query10-2008 to 11-9-2010.xls gasoline PM one pager.107.doc MargoPMBriefing090806_ver4.ppt

---

Linc & all,

Here are some summary documents & emails regarding ASD's Kansas City PM testing. My notes indicate that the testing used the LA92 cycle (which I don't have any experience with); tested 480 1994-2000 model year vehicles; used the PEMS to measure PM emissions, etc. The PM emissions were analyzed to determine their composition (organic compounds, inorganic compounds, metals, etc).

CISD checked with the big 6 manufacturers and all indicated that Tier 2 vehicles gasoline vehicles were not expected to have much problem meeting the PM standards. CISD tested approx 33 cert & in-use vehicles from 2007-2010 and all met the applicable PM standards (including 3 vehicles procured by ASD specifically because they had excessive oil consumption). We especially targeted SIDI (spark ignition direct injection) vehicles. The Kansas City data indicated that PM emissions were highest at cold ambient temperatures and on the US06 cycle, however all vehicles which CISD tested on the US06 cycle met the SFTP composite PM standard---(the composite SFTP standard is not very severe). We didn't test any vehicles at cold ambient temperatures (or both cold ambient and the US06 driving cycle).

My short summary is that CISD testing on Tier 2 vehicles couldn't replicate the high PM levels found in Kansas City testing. It was interesting to note that PM emissions were substantially higher on Tier 2 gasoline vehicles than Tier 2 diesel vehicles (with PM filters).

Here's some background presentations, ASD's summary of the Kansas City testing, an email to Karl summarizing CISD testing from 7/1/07 to 7/28/08 (with data); Karen's verify query of EPA PM test data from 10/2008 to 11/9/2010, ASD's 9/9/06 Margo briefing. ASD's KC data, more recent Margo briefings, etc are at H://ASD/PM/Gas PM/.

Dave


KC-CRC-and-LADCO-presentation03-21-07.ppt


Verify PM query10-2008 to 11-9-2010.xls


gasoline PM one pager.107.doc


MargoPMBriefing090806_ver4.ppt

----- Forwarded by David Good/AA/USEPA/US on 11/30/2010 04:25 PM -----

From: David Good/AA/USEPA/US
To: Karl Simon/DC/USEPA/US@EPA

Cc: Janet Cohen/AA/USEPA/US@EPA, Linc Wehrly/AA/USEPA/US@EPA, Martin Reineman/AA/USEPA/US@EPA, Maria Peralta/AA/USEPA/US@EPA, Antonio Fernandez/AA/USEPA/US@EPA, Robin Moran/AA/USEPA/US@EPA, CarlR Fulper/AA/USEPA/US@EPA, Ed Nam/AA/USEPA/US@EPA, Linc Wehrly/AA/USEPA/US@EPA, Holly Pugliese/AA/USEPA/US@EPA, John Koupal/AA/USEPA/US@EPA, Lynn Sohacki/AA/USEPA/US@EPA
Date: 07/24/2008 01:37 PM
Subject: Fw: Gasoline PM testing update

Karl, Linc & all,

Summary: As of July 23, 2008, we have tested a total of 20 gasoline-fueled vehicles at EPA for particulates on the FTP (city), highway and US06 tests (81 total tests). The 20 test vehicles include 10 certification vehicles, 10 in-use vehicles, and 11 vehicles equipped with Spark Ignition Direct Injection (SIDI) engines. The 10 in-use vehicles include 3 vehicles with SIDI and 3 vehicles with a history of high oil consumption. All vehicles passed the applicable PM standards with a comfortable margin. PM emissions appear to be higher on SIDI vehicles than conventional port fuel injected vehicles. Based on this data, we see no reason to revise the certification regulations, IUVP testing requirements, defect reporting requirements, etc-----for example, current certification regulations allow manufacturers to provide a statement of compliance that gasoline-fueled vehicles comply with PM standards (in lieu of providing test data).

In-use SIDI vehicles: In May 2008, we tested three 2006 in-use VW Passat vehicles equipped with 2.0-liter turbocharged SIDI engines as part of EPA's in-use surveillance program. We recruited vehicles with the highest mileage possible, with odometer mileages ranging from 42,000 to 59,000 miles. All vehicles passed the Tier 2 (Bin 5) PM standard comfortably.

Future testing plans: Over the next year, we plan to test 10-15 in-use surveillance vehicles equipped with SIDI engines. We intend to measure PM on all three vehicles in each in-use surveillance class. We will attempt to recruit vehicles with the highest mileage possible, however SIDI is relatively new technology, so it is almost impossible to find SIDI vehicles with mileage above 70,000 miles. The following SIDI vehicles have relatively high sales and are potential in-use testing candidates: 2006 Lexus IS250, 2006 Lexus GS300, 2007 Porsche Cayenne, 2007 Lexus IS 350, 2007 Lexus GS350, 2007 Audi A4/A6 equipped with 3.1-liter engines, 2007 VW Passat equipped with 3.6-liter engines, and 2007 VW Touareg equipped with 3.6-liter engines.

Test data: Test data is attached, along with last year's email summary and a one-pager outlining the issue (for reference).

Thanks to everyone who helped----especially LOD for help with the testing, Lynn Sohacki, for help with recruiting/testing the in-use vehicles and Vince Mazaitis, for help with the data and the spreadsheet.

Let me know if you have any comments about the program, suggestions for testing, etc.

Regards

EPA gasoline PM testing-7-23-08 short version.xls

----- Forwarded by David Good/AA/USEPA/US on 07/23/2008 04:35 PM -----

David Good/AA/USEPA/US
Sent by: David Good

Received Date:
07/17/2007 05:12 PM
Transmission Date:
07/17/2007 05:12:38 PM

To ks

cc Janet Cohen/AA/USEPA/US@EPA, Linc Wehrly/AA/USEPA/US@EPA, Martin Reineman/AA/USEPA/US@EPA, Maria Peralta/AA/USEPA/US@EPA, Antonio Fernandez/AA/USEPA/US@EPA, Robin Moran/AA/USEPA/US@EPA, CarlR Fulper/AA/USEPA/US@EPA, Ed Nam/AA/USEPA/US@EPA

Subject Gasoline PM testing update

Karl & all,

Summary: As of July 17, 2007, we have tested 13 gasoline-fueled vehicles at EPA for particulates on the FTP (city), highway and US06 tests (60 tests). Of the 13 test vehicles, six were certification vehicles and seven were in-use vehicles. To date, PM emissions have been very low, with all vehicles well under the Tier 2 PM standards. PM emissions appear to be higher on direct injection vehicles than conventional port fuel injected vehicles.

Certification vehicle testing: For the six 2007-08 model year certification vehicles, four were equpped with direct fuel injection. Mileages were approximately 4000-5000 miles. PM emissions on the FTP (city) tests ranged from 10% to 50% of the Tier 2 PM standard (10 mg/mile). PM emissions on the US06 test were less than 10% of the Tier 2 SFTP emission standard of 70 mg/mile composite (where the composite weighting is equal to .72 x FTP + .28 x US06).

In-use vehicle testing: For the seven in-use vehicles, two were 2001 model year, two were 2002 model year and three were 2005 model year vehicles. Mileages ranging from 25,000 to 76,000 miles (5 vehicles were above 50,000 miles). The four 2001-02 model year vehicles were recruited by ASD specifically because they exhibited high oil consumption (on the order of one quart every 1500 miles or so). PM emissions on the FTP ranged from approximately 10% to 60% of the Tier 2 emission standards (including the vehicles with high oil consumption). PM emissions on the US06 tests were less than 33% of the Tier 2 SFTP standard.

Future testing: We intend to continue testing certification and in-use vehicles. We intend to test some direct injection vehicles in our in-use surveillance program.

Outreach: In the April 26, 2007 EPA Industry meeting, CISD (LincWehrly) presented an overview of our test program, the reasons for our concern, etc to the auto industry. On March 21, 2007, ASD (John Koupal) presented an overview of ASD's Kansas City PM testing in a LADCO Reagional Air Quality Workshop held in Kansas City.

Test data: The EPA PM data is attached. It represents a joint effort from LOD, ASD, and CISD. Let me know if anyone has any questions about the data or recommendations future testing.

Regards

[Attachment deleted]

----- Forwarded by David Good/AA/USEPA/US on 07/17/2007 02:57 PM -----

David Good/AA/USEPA/US
EPA-OAR,OTAQ,CISD
Sent by: David Good

Received Date:
03/26/2007 04:24 PM
Transmission Date:
03/26/2007 04:24:16 PM

To ks

cc Janet Cohen/AA/USEPA/US@EPA, Dan Harrison/AA/USEPA/US@EPA, Linc Wehrly/AA/USEPA/US@EPA, Martin Reineman/AA/USEPA/US@EPA

Subject Gasoline PM strategy

Karl,

Dan & I met with ASD today to coordinate our testing strategy, etc. ASD (Robin) would like us to do as much testing as LOD can support. [LOD testing is somewhat limited because dyno 329 is the only dyno which we can do PM testing----and dyno 329 is needed for other projects (E85 testing, 4WD vehicles, diesel in-use surveillance tesing, etc).] ASD wants us to perform high mileage tests on Tier 2 vehicles---so that the PM data can be used in the MOVES model. We'll try to accomodate them as much as we can, however Tier 2 standards started in the 2004 model year----and it will be very difficult to recruit representative high mileage 2004MY vehicles for a few more years.

To date, we have tested 4 gasoline direct injection certification vehicles for PM (see attached summary). This week (W, Th, F) we will be testing a GM GDI correlation vehicle. It ran 3 tests at GM and will run 3 tests at EPA. We feel that it is very important to establish correlation with the industry before proceeding with in-use testing----because it is quite possible that some vehicles will fail the PM standard. Also there are a few other technical issues we need to work thru with the lab. Hopefully, we can start in-use testing by the end of April.

Dan wanted me to send you our first draft Gasoline PM Strategy paper. We'll do some homework with LOD and add ASD's concerns to the paper next week or so.

Regards

gasoline PM one pager.107.wpd